



Burlington
Environmental

RCRA REPORT
ADMINISTRATIVE RECORD
ITEM NUMBER _____
TOTAL NUMBER OF PAGES _____

42061
WA 2917
12.3.92
84

December 3, 1992

Joe Depner
Burlington Environmental Technical Services
7440 West Marginal Way South
Seattle, WA 98108

Project: Pier 91 Drilling, Project #624878

Dear Joe:

Five soil samples for the Pier 91 Drilling Project #624878 were received at our laboratory September 30, 1992. These samples were received in good condition. The samples were analyzed for total metals and PCBs at the Burlington Environmental Corporate Laboratory and Volatiles were analyzed on the same samples by Analytical Resources Inc (ARI). This ARI sample set (B858) includes MS and MSD results.

All samples were extracted and analyzed within EPA SW-846 required holding times, except for the PCB extraction of sample 42061-3. Analysis dates and extraction dates (as applicable) are included in the metals report and in the report from ARI. The PCBs were extracted and analyzed in batches. These dates are tabulated below. All PCB surrogates recovered between 50% and 150%, except for the surrogate on sample 42061-3 which was masked by the PCBs.

<u>Laboratory Number(s)</u>	<u>GC Run Number(s)</u>	<u>Date(s) Extracted</u>	<u>Date(s) Analyzed</u>
42061-1, -2, -4, -5	DAFF and DAFG	10/09/92	10/15/92 and 10/22/92
42061-3	DAFI and BAJO	10/30/92	11/6/92

All analyses were conducted according to EPA SW-846 Methods specified in the work plan. Additional analytical and quality control information is included in the attached analytical reports.

Sincerely,

Kathy E. Kreps
Laboratory Manager
Burlington Environmental Inc.

enclosure

FILE COPY



General Laboratory Report

Lab Number : 42061
Plant/Generator Name : BEI Tech Serv, Pier 91, Pj 624878, Task 7301, 7302
Sample Type : Soils
Date of Receipt : 09/30/92 Analyst: BLW,BB,JLB,DKW
Date of Report : 12/02/92 QC Checked: AK
Parameters for Analysis: Total Metals, PCBs, Volatiles
Outside Lab : ARI Outside Lab Report No: B858

Data:

These five soil samples from Pier 91 Project 624878, Task 7301 and 7302, samples CP-HA4-1.5-2, CP-HA4-3-3.5, CP-HA9-1.5-2, CP-HA10-4.5-5, and CP-HA10-5-5.5 were analyzed for Total Metals and PCBs by the Burlington Environmental Corporate Laboratory and for Volatiles by Analytical Resources, Inc. Copies of all results are attached.

Comments and Conclusions:



**210 West Sand Bank Road
P.O. Box 330
Columbia, IL 62236-0330
618/281-7173
618/281-5120 FAX**

CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 6071

PROJECT NAME		PROJECT NUMBER		MAJOR TASK		NO. OF CONTAINERS	TYPE OF ANALYSIS					PRESERVATIVES		REMARKS (CHEMICAL ANALYSIS REQUEST FORM NUMBER IF APPLICABLE)		
SAMPLERS		LAB DESTINATION		SAMPLE NO.	DATE		TIME	COMP	GRAB	SAMPLE LOCATION	TOTAL METALS	PCB's	VOC		ICED	CHEMICALS ADDED
PIER 91		7301, 7302														
624878		7301														
J. P. RILEY																
BET																
2061-1	9-28	1040		X	CP-HA1-1.5-2	2	X	X					X		HOLD METALS FOR QUANT. LIMITS. CALL JOE DEPMER AT 767.3300	
2061-2	9-28	1050		X	CP-HA1-3.3.5	2	X	X					X			
2061-3	9-29	1125		X	CP-HA9-1.5-2	2	X	X					X			
2061-4	9-29	1400		X	CP-HA10-4.5-5	2	X	X					X			
2061-5	9-29	1440		X	CP-HA10-5.5-5	2	X	X					X			

RELINQUISHED BY

RECEIVED BY

SIGNATURE	DATE	TIME	SIGNATURE	DATE	TIME
[Signature]	9-30	1655	[Signature]	9/30/12	17:00
SHIPPING NOTES			LAB NOTES		

PCB Laboratory Report

Page 1

Lab Number : 42061

Plant/Generator Name : / BEI TECHNICAL SERVICES, PJ#624878 TASK73

Sample Type : SOILS

Date of Receipt : 09/30/92

Analyst: BLW, BB, JLB, DKW

Date of Report : 11/25/92

QC Checked: *Rabba Krep* 11/30/92

Outside Lab : NONE

Outside Lab Report No:

Number of Samples : 5



<u>Run #</u>	<u>Sample ID</u>	<u>Code</u> <u>Numbers</u>	<u># Drums</u> <u>in Composite</u>	<u>Aroclor #</u>	<u>Total PCB</u> <u>(ppm)</u>
DAFF66	B10092-3	BLANK			<0.1
DAFG55	42061-1	CP-HA4-1.5-2		1254	1.4
DAFG56	42061-2	CP-HA4-3-3.5		1254	1.8
BAJO78	42061-3	CP-HA9-1.5-2		1254, 1260	1.4
DAFG58	42061-4	CP-HA10-4.5-5		1254, 1260	0.71
DAFG59	42061-5	CP-HA10-5-5.5		1254, 1260	0.16
DAFF75	QC1248	QC (ADVISORY RA NGE 12-45ppm)		1248	21.
DAFG82	42306-24	V-EML-E-37F-6			<1.0
DAFG83	42306-24	DUPE (RPD=0%)			<1.0
DAFF65	42061	5.0 PPM CCV		1254	5.0
DAFF76	42061	5.0 PPM CCV		1248	5.0
DAFF87	42061	5.0 PPM CCV		1248	5.4
DAFG53	42061	5.0 PPM CCV		1254	5.2
DAFG65	42061	5.0 PPM CCV		1254	4.5
BAJO70	42061	5.0 PPM CCV		1248	5.3
BAJO81	42061	5.0 PPM CCV		1254	5.6

[illegible][illegible]



CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 6071

RELINQUISHED BY		RECEIVED BY	
SIGNATURE	DATE	SIGNATURE	DATE
	9-30		9/30/12
SHIPPING NOTES		LAB NOTES	

Metals Laboratory Report

Lab Number : 42061

Plant/Generator Name : BEI TECHNICAL SERVICES, PJ#624878 TASK7301,7302

Sample Type : SOILS

Date of Receipt : 09/30/92 Analyst: BLW, BB, JLB

Date of Report : 10/29/92 QC Checked: SPB 10/30/92

Parameters for Analysis: TOTAL METALS

Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

	42061-1	42061-2	42061-3	42061-4
Metals:	CP-HA4-1.5-2	CP-HA4-3-3.5	CP-HA9-1.5-2	CP-HA10-4.5-5
Silver	<0.44	<0.39	<0.42	<0.40
Arsenic	2.0	3.0	5.3	1.9
Barium	33.9	71.1	53.3	14.8
Beryllium	0.22	0.20	0.28	0.20
Cadmium	1.0	2.7	1.0	0.24
Chromium	18.2	55.6	60.8	17.2
Copper	15.9	43.3	24.9	5.9
Mercury	0.069	0.13	0.11	<0.018
Nickel	24.7	30.2	28.1	21.1
Lead	143.	281.	155.	9.6
Selenium	<0.22	<0.21	<0.21	<0.22
Zinc	138.	261.	151.	32.0
Dry Weight	91.8%	84.3%	91.7%	95.8%

Comments and Conclusions:

RESULTS ARE REPORTED AS MG/KG DRY WEIGHT.

Metals Laboratory Report

Lab Number : 42061
Plant/Generator Name : BEI TECHNICAL SERVICES, PJ#624878 TASK7301,7302
Sample Type : SOILS
Date of Receipt : 09/30/92 Analyst: BLW, BB, JLB
Date of Report : 10/29/92 QC Checked: BBB 10/30/92
Parameters for Analysis: TOTAL METALS
Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

Metals:	42061-5 CP-HA10-5-5.5	METHOD BLANK IN MG/L
Silver	<0.40	<0.010
Arsenic	1.7	<0.010
Barium	15.3	<0.20
Beryllium	0.23	<0.005
Cadmium	0.43	<0.005
Chromium	18.8	<0.010
Copper	8.4	<0.025
Mercury	<0.019	<0.0002
Nickel	21.3	<0.040
Lead	15.4	<0.003
Selenium	<0.45	<0.005
Zinc	32.4	<0.020
Dry Weight	95.1%	

Comments and Conclusions:

RESULTS ARE REPORTED AS MG/KG DRY WEIGHT.
DATES ANALYZED: 10/20/92, 10/21/92, 10/22/92,
10/29/92.
Hg ANALYZED ON 10/07/92.

Metals Laboratory Report

Lab Number : 42061Q

Plant/Generator Name : PIER 91 DRILLING PROJECT #624878 TASK #7301, 7302.

Sample Type : SOILS

Date of Receipt : 09/30/92 Analyst: BLW, BB, JLB

Date of Report : 10/29/92 QC Checked: BBB 10/30/92

Parameters for Analysis: TOTAL METALS

Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

Metals:	CONTROL SAMPLE PPS-46	CONTROL SAMPLE % RECOVERY	42061-5 MS % RECOVERY	42061-5 MSD % RECOVERY
Silver	30.8	83.2	69.1	69.8
Arsenic	19.7	131.3	77.4	98.2
Barium	115.	85.8	96.0	93.3
Beryllium	13.3	88.7	92.8	90.7
Cadmium	93.5	85.8	85.2	85.4
Chromium	42.4	103.4	51.7	35.4
Copper	19.0	95.0	79.5	72.5
Mercury	5.47*	91.7	58.1	59.8
Nickel	27.5	98.2	94.2	91.7
Lead	65.4	88.4	52.5	58.0
Selenium	84.5	92.9	41.4	51.0
Zinc	49.6	93.6	75.8	70.2

Comments and Conclusions:

RESULTS ARE REPORTED AS MG/KG DRY WEIGHT.

*MERCURY CONTROL SAMPLE WAS SRS003.

Metals Laboratory Report

Lab Number : 42061Q
Plant/Generator Name : PIER 91 DRILLING PROJECT #624878 TASK #7301, 7302.
Sample Type : SOILS
Date of Receipt : 09/30/92 Analyst: BLW, BB, JLB
Date of Report : 10/29/92 QC Checked: *BBB* 10/30/92
Parameters for Analysis: TOTAL METALS
Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

<u>Metals:</u>	POST DIGESTION	% RECOVERY		CCV
	<u>SPIKE RECOVERY</u>	<u>ICV</u>	<u>ICV</u>	
Silver	82.2			102.2
Arsenic		104.4	100.4	107.2
Barium				103.8
Beryllium				102.3
Cadmium				106.6
Chromium	93.2			104.3
Copper	94.2			102.9
Nickel				107.0
Lead	96.0			104.7
Selenium		99.3		92.0
Zinc	89.3			102.0

Comments and Conclusions:

RESULTS ARE IN PERCENT RECOVERY.

Metals Laboratory Report

Lab Number : 42061Q
Plant/Generator Name : PIER 91 DRILLING PROJECT #624878 TASK #7301, 7302.
Sample Type : SOILS
Date of Receipt : 09/30/92 Analyst: BLW, BB, JLB
Date of Report : 10/29/92 QC Checked: *ADD 10/30/92*
Parameters for Analysis: TOTAL METALS
Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

Metals:	% RECOVERY	
	CCV	CCV
Silver	102.1	100.5
Arsenic	95.2	96.4
Barium	103.0	102.6
Beryllium	102.3	101.0
Cadmium	106.4	104.9
Chromium	104.9	104.1
Copper	101.6	100.1
Nickel	106.1	103.6
Lead	103.5	102.4
Selenium	92.8	92.8
Zinc	101.5	99.2

Comments and Conclusions:

RESULTS ARE IN PERCENT RECOVERY.

Certificate of Analysis

SOLID WASTE LABORATORY CONTROL SAMPLE

Catalog No: SRS003

Name: Metals on Soil

Lot No: BC003

USE EPA METHOD* 3050

Analysis by EPA* Method 3050

Arsenic (CAS# 1327-53-3)
Barium (CAS# 7440-39-3)
Cadmium (CAS# 7440-43-9)
Chromium (CAS# 7440-47-3)
Mercury (CAS# 7439-97-6)

30 + 20 PPM
575 + 65 PPM
1.3 + 0.7 PPM
12 + 5 PPM
6 + 3 PPM

* Test methods for evaluating SW846, Third Edition, 1986

Analytical ranges based on interlab 95% confidence levels.

Results based on a dry weight basis.

Manufactured by Resource Technology Corporation
for exclusive distribution by FISHER SCIENTIFIC.



**Fisher
Scientific**

Chemical Division
1 Reagent Lane
Fair Lawn, N.J. 07410
(201) 796-7100



Certification

PriorityPollutnT™/CLP Quality Control Standards

Inorganics in Soil

Parameter	Lot Number 212 Certified Value mg/kg	Advisory Range mg/kg
TRACE METALS		
aluminum	11500	6530-16500
antimony	52	0-160
arsenic	15	5.6-25
barium	134	93-174
beryllium	15	9.5-21
cadmium	109	76-142
calcium	7130	4990-9270
chromium	41	20-62
cobalt	211	148-274
copper	20	8.0-32
iron	14500	10100-20150
lead	74	37-111
magnesium	3620	2530-4710
manganese	310	217-403
mercury	31	15-46
molybdenum	16	8.0-24
nickel	28	8.0-48
potassium	3790	2650-4930
selenium	91	45-136
silver	37	18-56
sodium	400	173-627
thallium	99	48-150
vanadium	57	40-74
zinc	53	26-80
CYANIDE	147	74-220

30 October 1992



**ANALYTICAL
RESOURCES
INCORPORATED**

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Kathy Kreps
Burlington Environmental
2203 Airport Way South
Suite 400
Seattle, WA 98134

**RE: Client Project: 624878, Pier 91;
ARI Job #B858**

Dear Kathy:

Please find enclosed the results for the above referenced project. Your samples were received in good condition with no discrepancies in the paperwork. Analysis proceeded without incident.

Please note that because your samples had to be run at a medium level, the requested 0.7 ppb detection limit for Tetrachloroethene could not be achieved.

All raw data and a copy of this report will be kept on file by ARI should you need any further information regarding this project.

If you have any questions, please feel free to contact me at any time. You can reach me directly by calling 340-2866, ext. #118.

Sincerely,

ANALYTICAL RESOURCES, INC.

Suzanne Kitch
Project Coordinator

enclosures

cc: file B858



**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: B858A
Matrix: Soils/Sediments

Sample: 42061-1

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: 

Report: 10/27/92 MAC:X jr

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.034 gm (Dry Weight)
Percent Moisture: 14.9%

CAS Number		µg/Kg
74-87-3	Chloromethane	300 U
74-83-9	Bromomethane	300 U
75-01-4	Vinyl Chloride	300 U
75-00-3	Chloroethane	300 U
75-09-2	Methylene Chloride	970 B
67-64-1	Acetone	740 U
75-15-0	Carbon Disulfide	150 U
75-35-4	1,1-Dichloroethene	150 U
75-34-3	1,1-Dichloroethane	260
156-60-5	Trans-1,2-Dichloroethene	150 U
156-59-2	Cis-1,2-Dichloroethene	150 U
67-66-3	Chloroform	150 U
107-06-2	1,2-Dichloroethane	150 U
78-93-3	2-Butanone	2800 UJ
71-55-6	1,1,1-Trichloroethane	150 U
56-23-5	Carbon Tetrachloride	150 U
108-05-4	Vinyl Acetate	150 U
75-27-4	Bromodichloromethane	150 U
78-87-5	1,2-Dichloropropane	150 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	150 U
79-01-6	Trichloroethene	150 U
124-48-1	Dibromochloromethane	150 U
79-00-5	1,1,2-Trichloroethane	150 U
71-43-2	Benzene	310
10061-02-6	trans-1,3-Dichloropropene	150 U
110-75-8	2-Chloroethylvinylether	150 U
75-25-2	Bromoform	150 U
108-10-1	4-Methyl-2-Pentanone	740 U
591-78-6	2-Hexanone	740 U
127-18-4	Tetrachloroethene	580
79-34-5	1,1,2,2-Tetrachloroethane	150 U
108-88-3	Toluene	9700
108-90-7	Chlorobenzene	300 UJ
100-41-4	Ethylbenzene	3100
100-42-5	Styrene	440 UJ
1330-20-7	Total Xylenes	22000
75-69-4	Trichlorofluoromethane	300 U
76-13-1	1,1,2-Trichlorotrifluoroethane	1100

Surrogate Recoveries

d8-Toluene	90.6%
Bromofluorobenzene	107%
d4-1,2-Dichloroethane	87.9%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: B858B

Matrix: Soils/Sediments

Sample: 42061-2

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: *David B. Little*

Report: 10/27/92 MAC:Xjjr

Instrument: FINN 1

Date Analyzed: 10/02/92

Amount Analyzed: 0.036 gm (Dry Weight)

Percent Moisture: 13.8%

CAS Number		µg/Kg
74-87-3	Chloromethane	280 U
74-83-9	Bromomethane	280 U
75-01-4	Vinyl Chloride	280 U
75-00-3	Chloroethane	280 U
75-09-2	Methylene Chloride	370 B
67-64-1	Acetone	690 U
75-15-0	Carbon Disulfide	140 U
75-35-4	1,1-Dichloroethene	140 U
75-34-3	1,1-Dichloroethane	350
156-60-5	Trans-1,2-Dichloroethene	140 U
156-59-2	Cis-1,2-Dichloroethene	140 U
67-66-3	Chloroform	140 U
107-06-2	1,2-Dichloroethane	140 U
78-93-3	2-Butanone	2900 UJ
71-55-6	1,1,1-Trichloroethane	140 U
56-23-5	Carbon Tetrachloride	140 U
108-05-4	Vinyl Acetate	140 U
75-27-4	Bromodichloromethane	140 U
78-87-5	1,2-Dichloropropane	140 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	140 U
79-01-6	Trichloroethene	140 U
124-48-1	Dibromochloromethane	140 U
79-00-5	1,1,2-Trichloroethane	140 U
71-43-2	Benzene	320
10061-02-6	trans-1,3-Dichloropropene	140 U
110-75-8	2-Chloroethylvinylether	140 U
75-25-2	Bromoform	140 U
108-10-1	4-Methyl-2-Pentanone	690 U
591-78-6	2-Hexanone	690 U
127-18-4	Tetrachloroethene	740
79-34-5	1,1,2,2-Tetrachloroethane	140 U
108-88-3	Toluene	9500
108-90-7	Chlorobenzene	280 UJ
100-41-4	Ethylbenzene	2900
100-42-5	Styrene	420 UJ
1330-20-7	Total Xylenes	20000
75-69-4	Trichlorofluoromethane	280 U
76-13-1	1,1,2-Trichlorotrifluoroethane	950

Surrogate Recoveries

d8-Toluene	84.4%
Bromofluorobenzene	90.7%
d4-1,2-Dichloroethane	84.1%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

**ANALYTICAL
RESOURCES
INCORPORATED****ORGANICS ANALYSIS DATA SHEET****Volatiles by Purge & Trap GC/MS**

Lab ID: B858Bms

Matrix: Soils/Sediments

Sample: 42061-2

Matrix Spike

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)Data Release Authorized: *[Signature]*

Report: 10/27/92 MAC:X jr

Instrument: FINN 1

Date Analyzed: 10/02/92

Amount Analyzed: 0.034 gm (Dry Weight)

Percent Moisture: 13.8%

CAS Number		µg/Kg
74-87-3	Chloromethane	290 U
74-83-9	Bromomethane	290 U
75-01-4	Vinyl Chloride	290 U
75-00-3	Chloroethane	290 U
75-09-2	Methylene Chloride	290 U
67-64-1	Acetone	730 U
75-15-0	Carbon Disulfide	150 U
75-35-4	1,1-Dichloroethene	-
75-34-3	1,1-Dichloroethane	270
156-60-5	Trans-1,2-Dichloroethene	150 U
156-59-2	Cis-1,2-Dichloroethene	150 U
67-66-3	Chloroform	150 U
107-06-2	1,2-Dichloroethane	150 U
78-93-3	2-Butanone	1800 UJ
71-55-6	1,1,1-Trichloroethane	150 U
56-23-5	Carbon Tetrachloride	150 U
108-05-4	Vinyl Acetate	150 U
75-27-4	Bromodichloromethane	150 U
78-87-5	1,2-Dichloropropane	150 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	150 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	150 U
79-00-5	1,1,2-Trichloroethane	150 U
71-43-2	Benzene	-
10061-02-6	trans-1,3-Dichloropropene	150 U
110-75-8	2-Chloroethylvinylether	150 U
75-25-2	Bromoform	150 U
108-10-1	4-Methyl-2-Pentanone	730 U
591-78-6	2-Hexanone	730 U
127-18-4	Tetrachloroethene	890
79-34-5	1,1,2,2-Tetrachloroethane	150 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	2500
100-42-5	Styrene	440 UJ
1330-20-7	Total Xylenes	18000
75-69-4	Trichlorofluoromethane	290 U
76-13-1	1,1,2-Trichlorotrifluoroethane	700

Surrogate Recoveries

d8-Toluene	86.1%
Bromofluorobenzene	93.1%
d4-1,2-Dichloroethane	84.9%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: B858Bmsd
Matrix: Soils/Sediments

Sample: 42061-2

Matrix Spike Dup.

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: *[Signature]*
Report: 10/27/92 MAC:Xjjr

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.036 gm (Dry Weight)
Percent Moisture: 13.8%

CAS Number		µg/Kg
74-87-3	Chloromethane	280 U
74-83-9	Bromomethane	280 U
75-01-4	Vinyl Chloride	280 U
75-00-3	Chloroethane	280 U
75-09-2	Methylene Chloride	450 B
67-64-1	Acetone	700 U
75-15-0	Carbon Disulfide	140 U
75-35-4	1,1-Dichloroethene	-
75-34-3	1,1-Dichloroethane	320
156-60-5	Trans-1,2-Dichloroethene	140 U
156-59-2	Cis-1,2-Dichloroethene	140 U
67-66-3	Chloroform	140 U
107-06-2	1,2-Dichloroethane	140 U
78-93-3	2-Butanone	2500 UJ
71-55-6	1,1,1-Trichloroethane	140 U
56-23-5	Carbon Tetrachloride	140 U
108-05-4	Vinyl Acetate	140 U
75-27-4	Bromodichloromethane	140 U
78-87-5	1,2-Dichloropropane	140 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	140 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	140 U
79-00-5	1,1,2-Trichloroethane	140 U
71-43-2	Benzene	-
10061-02-6	trans-1,3-Dichloropropene	140 U
110-75-8	2-Chloroethylvinylether	140 U
75-25-2	Bromoform	140 U
108-10-1	4-Methyl-2-Pentanone	700 U
591-78-6	2-Hexanone	700 U
127-18-4	Tetrachloroethene	790
79-34-5	1,1,2,2-Tetrachloroethane	140 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	2700
100-42-5	Styrene	420 UJ
1330-20-7	Total Xylenes	19000
75-69-4	Trichlorofluoromethane	280 U
76-13-1	1,1,2-Trichlorotrifluoroethane	870

Surrogate Recoveries

d8-Toluene	85.1%
Bromofluorobenzene	91.5%
d4-1,2-Dichloroethane	85.7%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
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Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ARI Job No: B858

Client: Burlington Env.

Project: 624878

Sample No: 42061-2

COMPOUND	SPIKE ADDED ($\mu\text{g/Kg}$)	SAMPLE CONC ($\mu\text{g/Kg}$)	MS CONC ($\mu\text{g/Kg}$)	MS % REC	QC LIMITS REC
1,1-Dichloroethene	7350	0	11000	150	59-172
Trichloroethene	7350	0	8280	113	62-137
Benzene	7350	324	8490	111	66-142
Toluene	7350	9490	16400	94.0	59-139
Chlorobenzene	7350	0	8490	116	60-133

COMPOUND	SPIKE ADDED ($\mu\text{g/Kg}$)	MSD CONC ($\mu\text{g/Kg}$)	MSD % REC	% RPD	Q C LIMITS	
					RPD	REC
1,1-Dichloroethene	6940	10000	144	4.1	22	59-172
Trichloroethene	6940	7700	111	1.8	24	62-137
Benzene	6940	8040	111	0.0	21	66-142
Toluene	6940	16400	99.6	-5.8	21	59-139
Chlorobenzene	6940	7760	112	3.5	21	60-133

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

Asterisked values outside QC Limits

Comments: QC Limits taken from CLP OLM01.6 (June 1991)

DBP

Report prepared: 10/27/92 MAC:X jlr



**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: B858C

Matrix: Soils/Sediments

Sample: 42061-3

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: *[Signature]*

Report: 10/27/92 MAC:Xjjr

Instrument: FINN 1

Date Analyzed: 10/02/92

Amount Analyzed: 0.037 gm (Dry Weight)

Percent Moisture: 9.5%

CAS Number		µg/Kg
74-87-3	Chloromethane	270 U
74-83-9	Bromomethane	270 U
75-01-4	Vinyl Chloride	270 U
75-00-3	Chloroethane	270 U
75-09-2	Methylene Chloride	380 B
67-64-1	Acetone	670 U
75-15-0	Carbon Disulfide	130 U
75-35-4	1,1-Dichloroethene	130 U
75-34-3	1,1-Dichloroethane	130 U
156-60-5	Trans-1,2-Dichloroethene	130 U
156-59-2	Cis-1,2-Dichloroethene	130 U
67-66-3	Chloroform	130 U
107-06-2	1,2-Dichloroethane	130 U
78-93-3	2-Butanone	2800 UJ
71-55-6	1,1,1-Trichloroethane	130 U
56-23-5	Carbon Tetrachloride	130 U
108-05-4	Vinyl Acetate	130 U
75-27-4	Bromodichloromethane	130 U
78-87-5	1,2-Dichloropropane	130 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	130 U
79-01-6	Trichloroethene	130 U
124-48-1	Dibromochloromethane	130 U
79-00-5	1,1,2-Trichloroethane	130 U
71-43-2	Benzene	92 M
10061-02-6	trans-1,3-Dichloropropene	130 U
110-75-8	2-Chloroethylvinylether	130 U
75-25-2	Bromoform	130 U
108-10-1	4-Methyl-2-Pentanone	670 U
591-78-6	2-Hexanone	670 U
127-18-4	Tetrachloroethene	130 U
79-34-5	1,1,2,2-Tetrachloroethane	130 U
108-88-3	Toluene	630
108-90-7	Chlorobenzene	130 U
100-41-4	Ethylbenzene	520
100-42-5	Styrene	130 U
1330-20-7	Total Xylenes	2600
75-69-4	Trichlorofluoromethane	270 U
76-13-1	1,1,2-Trichlorotrifluoroethane	270 U

Surrogate Recoveries

d8-Toluene	87.3%
Bromofluorobenzene	84.1%
d4-1,2-Dichloroethane	87.4%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: 8858D

Matrix: Soils/Sediments

Sample: 42061-4

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: *Don B. Potter*

Report: 10/27/92 MAC:X jjr

Instrument: FINN 1

Date Analyzed: 10/02/92

Amount Analyzed: 0.031 gm (Dry Weight)

Percent Moisture: 22.4%

CAS Number		µg/Kg
74-87-3	Chloromethane	320 U
74-83-9	Bromomethane	320 U
75-01-4	Vinyl Chloride	320 U
75-00-3	Chloroethane	320 U
75-09-2	Methylene Chloride	320 U
67-64-1	Acetone	800 U
75-15-0	Carbon Disulfide	160 U
75-35-4	1,1-Dichloroethene	160 U
75-34-3	1,1-Dichloroethane	160 U
156-60-5	Trans-1,2-Dichloroethene	160 U
156-59-2	Cis-1,2-Dichloroethene	160 U
67-66-3	Chloroform	160 U
107-06-2	1,2-Dichloroethane	160 U
78-93-3	2-Butanone	3400 UJ
71-55-6	1,1,1-Trichloroethane	160 U
56-23-5	Carbon Tetrachloride	160 U
108-05-4	Vinyl Acetate	160 U
75-27-4	Bromodichloromethane	160 U
78-87-5	1,2-Dichloropropane	160 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	160 U
79-01-6	Trichloroethene	160 U
124-48-1	Dibromochloromethane	160 U
79-00-5	1,1,2-Trichloroethane	160 U
71-43-2	Benzene	160
10061-02-6	trans-1,3-Dichloropropene	160 U
110-75-8	2-Chloroethylvinylether	160 U
75-25-2	Bromoform	160 U
108-10-1	4-Methyl-2-Pentanone	800 U
591-78-6	2-Hexanone	800 U
127-18-4	Tetrachloroethene	160 U
79-34-5	1,1,2,2-Tetrachloroethane	160 U
108-88-3	Toluene	2500
108-90-7	Chlorobenzene	480 UJ
100-41-4	Ethylbenzene	2000
100-42-5	Styrene	320 UJ
1330-20-7	Total Xylenes	8400
75-69-4	Trichlorofluoromethane	320 U
76-13-1	1,1,2-Trichlorotrifluoroethane	320 U

Surrogate Recoveries

d8-Toluene	84.5%
Bromofluorobenzene	95.3%
d4-1,2-Dichloroethane	82.4%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: B858E
Matrix: Soils/Sediments

Sample: 42061-5

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: 10/01/92

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: *[Signature]*

Report: 10/27/92 MAC:Xjjr

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.039 gm (Dry Weight)
Percent Moisture: 6.1%

CAS Number		µg/Kg
74-87-3	Chloromethane	260 U
74-83-9	Bromomethane	260 U
75-01-4	Vinyl Chloride	260 U
75-00-3	Chloroethane	260 U
75-09-2	Methylene Chloride	260 U
67-64-1	Acetone	650 U
75-15-0	Carbon Disulfide	130 U
75-35-4	1,1-Dichloroethene	130 U
75-34-3	1,1-Dichloroethane	130 U
156-60-5	Trans-1,2-Dichloroethene	130 U
156-59-2	Cis-1,2-Dichloroethene	130 U
67-66-3	Chloroform	130 U
107-06-2	1,2-Dichloroethane	130 U
78-93-3	2-Butanone	2500 UJ
71-55-6	1,1,1-Trichloroethane	130 U
56-23-5	Carbon Tetrachloride	130 U
108-05-4	Vinyl Acetate	130 U
75-27-4	Bromodichloromethane	130 U
78-87-5	1,2-Dichloropropane	130 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	130 U
79-01-6	Trichloroethene	130 U
124-48-1	Dibromochloromethane	130 U
79-00-5	1,1,2-Trichloroethane	130 U
71-43-2	Benzene	130 U
10061-02-6	trans-1,3-Dichloropropene	130 U
110-75-8	2-Chloroethylvinylether	130 U
75-25-2	Bromoform	130 U
108-10-1	4-Methyl-2-Pentanone	650 U
591-78-6	2-Hexanone	650 U
127-18-4	Tetrachloroethene	130 U
79-34-5	1,1,2,2-Tetrachloroethane	130 U
108-88-3	Toluene	1300
108-90-7	Chlorobenzene	260 UJ
100-41-4	Ethylbenzene	1200
100-42-5	Styrene	130 U
1330-20-7	Total Xylenes	5400
75-69-4	Trichlorofluoromethane	260 U
76-13-1	1,1,2-Trichlorotrifluoroethane	260 U

Surrogate Recoveries

d8-Toluene	91.4%
Bromofluorobenzene	96.3%
d4-1,2-Dichloroethane	87.6%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
RESOURCES
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ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: 1002MB

Matrix: Soils/Sediments

Data Release Authorized: *[Signature]*

Report: 10/27/92 MAC:Xjjr

Sample: Method Blank

QC Report No: B858 - Burlington Env.

Project: 624878

Pier 91

VTSR: NA

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.040 gm (Dry Weight Equivalent)
Percent Moisture: NA

CAS Number		µg/Kg
74-87-3	Chloromethane	250 U
74-83-9	Bromomethane	250 U
75-01-4	Vinyl Chloride	250 U
75-00-3	Chloroethane	250 U
75-09-2	Methylene Chloride	400
67-64-1	Acetone	630 U
75-15-0	Carbon Disulfide	130 U
75-35-4	1,1-Dichloroethene	130 U
75-34-3	1,1-Dichloroethane	130 U
156-60-5	Trans-1,2-Dichloroethene	130 U
156-59-2	Cis-1,2-Dichloroethene	130 U
67-66-3	Chloroform	130 U
107-06-2	1,2-Dichloroethane	130 U
78-93-3	2-Butanone	630 U
71-55-6	1,1,1-Trichloroethane	130 U
56-23-5	Carbon Tetrachloride	130 U
108-05-4	Vinyl Acetate	130 U
75-27-4	Bromodichloromethane	130 U
78-87-5	1,2-Dichloropropane	130 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	130 U
79-01-6	Trichloroethene	130 U
124-48-1	Dibromochloromethane	130 U
79-00-5	1,1,2-Trichloroethane	130 U
71-43-2	Benzene	130 U
10061-02-6	trans-1,3-Dichloropropene	130 U
110-75-8	2-Chloroethylvinylether	130 U
75-25-2	Bromoform	130 U
108-10-1	4-Methyl-2-Pentanone	630 U
591-78-6	2-Hexanone	630 U
127-18-4	Tetrachloroethene	130 U
79-34-5	1,1,2,2-Tetrachloroethane	130 U
108-88-3	Toluene	130 U
108-90-7	Chlorobenzene	130 U
100-41-4	Ethylbenzene	130 U
100-42-5	Styrene	130 U
1330-20-7	Total Xylenes	250 U
75-69-4	Trichlorofluoromethane	250 U
76-13-1	1,1,2-Trichlorotrifluoroethane	250 U

Surrogate Recoveries

d8-Toluene	96.2%
Bromofluorobenzene	100%
d4-1,2-Dichloroethane	95.8%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



**ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS

Lab ID: 1002MB2
Matrix: Soils/Sediments

Sample: Methanol Blank

QC Report No: B858 - Burlington Env.
Project: 624878
Pier 91
VTSR: NA

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Data Release Authorized: 
Report: 10/27/92 MAC:Xjr

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.040 gm (Dry Weight Equivalent)
Percent Moisture: NA

CAS Number		µg/Kg
74-87-3	Chloromethane	250 U
74-83-9	Bromomethane	250 U
75-01-4	Vinyl Chloride	250 U
75-00-3	Chloroethane	250 U
75-09-2	Methylene Chloride	620 B
67-64-1	Acetone	630 U
75-15-0	Carbon Disulfide	130 U
75-35-4	1,1-Dichloroethene	130 U
75-34-3	1,1-Dichloroethane	130 U
156-60-5	Trans-1,2-Dichloroethene	130 U
156-59-2	Cis-1,2-Dichloroethene	130 U
67-66-3	Chloroform	130 U
107-06-2	1,2-Dichloroethane	130 U
78-93-3	2-Butanone	2500 U
71-55-6	1,1,1-Trichloroethane	130 U
56-23-5	Carbon Tetrachloride	130 U
108-05-4	Vinyl Acetate	130 U
75-27-4	Bromodichloromethane	130 U
78-87-5	1,2-Dichloropropane	130 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	130 U
79-01-6	Trichloroethene	130 U
124-48-1	Dibromochloromethane	130 U
79-00-5	1,1,2-Trichloroethane	130 U
71-43-2	Benzene	130 U
10061-02-6	trans-1,3-Dichloropropene	130 U
110-75-8	2-Chloroethylvinylether	130 U
75-25-2	Bromoform	130 U
108-10-1	4-Methyl-2-Pentanone	630 U
591-78-6	2-Hexanone	630 U
127-18-4	Tetrachloroethene	130 U
79-34-5	1,1,2,2-Tetrachloroethane	130 U
108-88-3	Toluene	130 U
108-90-7	Chlorobenzene	130 U
100-41-4	Ethylbenzene	130 U
100-42-5	Styrene	130 U
1330-20-7	Total Xylenes	250 U
75-69-4	Trichlorofluoromethane	250 U
76-13-1	1,1,2-Trichlorotrifluoroethane	250 U

Surrogate Recoveries

d8-Toluene	94.1%
Bromofluorobenzene	92.6%
d4-1,2-Dichloroethane	94.7%

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.



BURLINGTON ENVIRONMENTAL
2203 Airport Way South, Suite 400
Seattle, WA 98134
206-223-0500 • FAX: 223-7791

Chain of Custody/ Laboratory Analysis Request

DATE 10-1-92 PAGE 1 OF 1

PROJECT <u>P 91</u> # <u>624878</u> CLIENT INFO. CONTACT <u>K. Kreps</u> CHEMPCO DIVISION/GENERATOR NAME _____ TELEPHONE # <u>223-7791</u> SAMPLES NAME _____ PHONE # _____ SAMPLES SIGNATURE _____					ANALYSIS REQUESTED <table border="1" style="width:100%; border-collapse: collapse; font-size: small;"> <tr> <td style="width: 5%;">BASE/NEU/ACID ORGAN.</td> <td style="width: 5%;">GC/MS/625-8270</td> <td style="width: 5%;">VOLATILE ORGANICS</td> <td style="width: 5%;">GC/MS/62-8240</td> <td style="width: 5%;">PCB's</td> <td style="width: 5%;">TPH (circle method)</td> <td style="width: 5%;">BETX (circle method)</td> <td style="width: 5%;">F-LISTED SOLVENTS</td> <td style="width: 5%;">TCLP F-LISTED SOLVENTS</td> <td style="width: 5%;">TCLP METALS</td> <td style="width: 5%;">METALS (TOTAL)</td> <td style="width: 5%;">TCLP ORGANICS (specify methods)</td> <td style="width: 5%;">DISCHARGE TESTING</td> <td style="width: 5%;">OTHER (Specify)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td> As, Ba, Cd, Cr, Cu, Pb, Ni, Hg, Ag, Se, Ti, Sb, Zn • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150 </td> <td></td> <td></td> </tr> </table>										BASE/NEU/ACID ORGAN.	GC/MS/625-8270	VOLATILE ORGANICS	GC/MS/62-8240	PCB's	TPH (circle method)	BETX (circle method)	F-LISTED SOLVENTS	TCLP F-LISTED SOLVENTS	TCLP METALS	METALS (TOTAL)	TCLP ORGANICS (specify methods)	DISCHARGE TESTING	OTHER (Specify)												As, Ba, Cd, Cr, Cu, Pb, Ni, Hg, Ag, Se, Ti, Sb, Zn • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150			NUMBER OF CONTAINERS <u>1</u>	RECEIVED IN GOOD CONDITION? <u> </u>
BASE/NEU/ACID ORGAN.	GC/MS/625-8270	VOLATILE ORGANICS	GC/MS/62-8240	PCB's	TPH (circle method)	BETX (circle method)	F-LISTED SOLVENTS	TCLP F-LISTED SOLVENTS	TCLP METALS	METALS (TOTAL)	TCLP ORGANICS (specify methods)	DISCHARGE TESTING	OTHER (Specify)																															
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1. CP-HA4-1.5-2	9-28	1040	42061-1	Soil			X												1																									
2. CP-HA4-3-3.5	9-28	1050	42061-2	Soil			X												1																									
3. CP-HA9-1.5-2	9-29	1125	42061-3	Soil			X												1																									
4. CP-HA10-4.5-5	9-29	1400	42061-4	Soil			X												1																									
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6.																																												
7.																																												
8.																																												

Relinquished By <u>T. Claus</u> Signature <u>T. Claus</u> Printed Name <u>BET</u> Firm <u>10-1-92</u> Date/Time _____	Relinquished By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	Relinquished By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	SPECIAL INSTRUCTIONS/COMMENTS: <div style="font-size: large; text-align: center;">Low Level</div> <div style="font-size: large; text-align: center;">Cooler Temp 20°C</div> <div style="font-size: large; text-align: center;">A.R.I. # B858</div>
Received By <u>Jan Felkins</u> Signature <u>Jan Felkins</u> Printed Name <u>A.R.I.</u> Firm <u>10/1/92 10:00</u> Date/Time _____	Received By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	Received By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	



BURLINGTON ENVIRONMENTAL
2203 Airport Way South, Suite 400
Seattle, WA 98134
206-223-0500 • FAX: 223-7791

Chain of Custody/ Laboratory Analysis Request

DATE 10-1-92 PAGE 1 OF 1

PROJECT <u>P 91</u> # <u>624878</u> CLIENT INFO. CONTACT <u>K. Kreps</u> CHEMPRO DIVISION/GENERATOR NAME _____ TELEPHONE # <u>223-7791</u> SAMPLERS NAME _____ PHONE # _____ SAMPLERS SIGNATURE _____					ANALYSIS REQUESTED <table border="1" style="width:100%; border-collapse: collapse; font-size: 0.8em;"> <tr> <td style="width: 10%;">BASE/NEU/ACID ORGAN. GC/MS/625/8270</td> <td style="width: 10%;">VOLATILE ORGANICS GC/MS/624/8240</td> <td style="width: 10%;">PCB's 608/8080</td> <td style="width: 10%;">TPH (circle method) 418.1 or 8015</td> <td style="width: 10%;">BETX (circle method) 8240 or 8020</td> <td style="width: 10%;">F-LISTED SOLVENTS 8240</td> <td style="width: 10%;">TCLP F-LISTED SOLVENTS 1311/8240</td> <td style="width: 10%;">TCLP METALS D004-11</td> <td style="width: 10%;">METALS (TOTAL) As, Ba, Cd, Cr, Cu, Pb, Ni, Hg, Ag, Se, Ti, Sb, Zn</td> <td style="width: 10%;">TCLP ORGANICS (specify methods) • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150</td> <td style="width: 10%;">DISCHARGE TESTING</td> <td style="width: 10%;">OTHER (Specify)</td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> <td style="width: 10%;"> </td> </tr> </table>												BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	PCB's 608/8080	TPH (circle method) 418.1 or 8015	BETX (circle method) 8240 or 8020	F-LISTED SOLVENTS 8240	TCLP F-LISTED SOLVENTS 1311/8240	TCLP METALS D004-11	METALS (TOTAL) As, Ba, Cd, Cr, Cu, Pb, Ni, Hg, Ag, Se, Ti, Sb, Zn	TCLP ORGANICS (specify methods) • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150	DISCHARGE TESTING	OTHER (Specify)									NUMBER OF CONTAINERS RECEIVED IN GOOD CONDITION?
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Received By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	Received By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	Received By _____ Signature _____ Printed Name _____ Firm _____ Date/Time _____	

NO Samples	Matrix	Parameter	Meth No	Estimated Cost Per Sample	Estimated Extended Costs
5	Soil	VOA	2040	225 ⁰⁰	1125 ⁰⁰
THIS IS NOT AN INVOICE					
				TOTAL	\$ 1125 ⁰⁰

PROJECT MEMORANDUM

DATE: December 15, 1992

TO: Joe Depner, Hydrogeologist

FROM: Nels Cone, Chemist

SUBJECT: DATA VALIDATION OF ANALYTICAL RESULTS FROM PIER 91 RCRA FACILITY INVESTIGATION, PROJECT 624878, DATA SET #6

Between September 23 and October 5, 1992, soil samples were collected by Burlington Environmental Inc. (Burlington). These samples were submitted to Sound Analytical Services of Tacoma, Washington for semivolatile compound (EPA SW-846 Method 8270) and Total Petroleum Hydrocarbon (EPA SW-846 Methods 418.1 and 8015) analyses. I performed a review of the analytical results on samples CP-HA-6-4.5-5, CP-HA-6-6-6.5, CP-HA-3-4.5-5, and CP-HA-3-6-6.5.

Properly completed chain-of-custody forms were included, along with documented signatures from field to laboratory receipt. The samples were shown as having been properly iced and received in good condition. Holding times were clearly written and evaluated according to regulatory protocol (*National Functional Guidelines for Organic Data Review*, USEPA, 1990). The samples received the requested analyses, and laboratory extraction/analysis times met the established guidelines.

Relative percent differences between individual results indicate detection comparability, although not all met within required quality control (QC) guidelines. Method blank analyses displayed surrogate spike recoveries well within required QC limits, and no blank corrections were required.

Analytical results indicate elevated levels of hydrocarbon compounds requiring dilution in all samples tested. As a result, elevated detection limits were reported, and several sample surrogate recoveries were outside normal QC limits, as were recoveries for the matrix spike/matrix spike duplicate analyses. The samples were diluted to ensure that target analytes were within the instrument calibration range with the exception of total petroleum fuel hydrocarbons analyses (Method 8015) for samples CP-HA-6-6-6.5 and CP-HA-3-6-6.5. In these samples, contaminating hydrocarbons were not identified as matching the elution pattern for any single product. The total concentration exceeded the calibration range, resulting in values that should be considered as estimated quantities.

In spite of an attempt to clean samples for semivolatile analyses by gel permeation chromatography, the samples required further dilution. As a consequence of this dilution, results from the semivolatile analyses were found to be below the practical quantitation limits for several detected compounds. Supporting documentation for these analyses included chromatographic and mass spectral data. Data consistency was demonstrated throughout.

Page 2

Project Memorandum from Nels Cone

Subject: Data Validation, Pier 91, Data Set #6

December 15, 1992

Proper data qualifier flags accompanied the analytical results as needed, and their use is consistent with USEPA guidelines. Overall, the data quality objectives as defined in Table F-2 of the QAPP are met. Accordingly, this data set can be considered valid for its intended use.

NC/rlk/b42:1952b.mem

Data Set 6

SOUND ANALYTICAL SERVICES, INC. RECEIVED

DEC 9 1992

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-2310 BURLINGTON ENVIRONMENTAL INC.

December 7, 1992

To: BURLINGTON ENVIRONMENTAL ENGINEERING

PROJECT NUMBER: 624878

PROJECT NAME: Pier 92

LABORATORY WORK ORDER NUMBER: 27267

Samples were taken on 9/21/92 to 9/22/92, and received at SAS on 9/22/92. The samples were analyzed for semivolatile organics by EPA 8270, Total Petroleum Hydrocarbons by EPA 418.1 modified for soils, and Total Petroleum Fuel Hydrocarbons by EPA 8015 modified.

SEMIVOLATILE ORGANICS-

Samples 27267-1, -2, -3, and -4 were analyzed for semivolatile organics by EPA 8270. All samples underwent GPC cleanup due to high matrix interferences. All samples were extracted and analyzed within holding times. Samples -1, -2, and -4 were diluted to bring components within the instrumental calibration range. Sample -3 was diluted, but due to high matrix interferences, all compounds were below the PQL. No target analyte was found above the PQL in the method blank. Matrix spike/matrix spike duplicate percent recovery results were outside QC limits due to sample dilution. Surrogate spikes were outside QC limits due to sample dilution.

TOTAL PETROLEUM HYDROCARBONS-

Samples -1, -2, -3, and -4 were analyzed for Total Petroleum Hydrocarbons using EPA 418.1 modified on 9/24/92. Samples were extracted and analyzed within holding times. Matrix spike/matrix spike duplicate results were outside QC limits for percent recovery due to sample dilution. All other quality control parameters were within acceptance limits.

TOTAL PETROLEUM FUEL HYDROCARBONS-

Samples -1, -2, -3, and -4 were extracted on 9/24/92, and analyzed on 10/1/92 using EPA 8015 modified. Both extraction and analysis were within holding times. Samples -1, -2, -3, and -4 were flagged as being multi-component products, having Gasoline, Diesel and heavier range components in the samples. Samples -2, and -4 were flagged as exceeding calibration ranges, and should be considered estimated quantities. The surrogate recoveries for all samples were outside quality control limits due to required

SOUND ANALYTICAL SERVICES, INC.

sample dilution. The percent recoveries of the matrix spike/matrix spike duplicate was outside QC limits due to sample dilution.

Results were reported dry weight corrected for all analysis.

No blank correction was used for any analysis.

Data qualifier flags are included behind the quality control package.